experiment-8

May 2, 2025

[1]: ```
pip install pandas
```

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: pandas in
c:\users\advik\appdata\roaming\python\python312\site-packages (2.2.3)
Requirement already satisfied: numpy>=1.26.0 in
c:\users\advik\appdata\roaming\python\python312\site-packages (from pandas)
(2.2.2)
Requirement already satisfied: python-dateutil>=2.8.2 in
c:\users\advik\appdata\roaming\python\python312\site-packages (from pandas)
(2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in
c:\users\advik\appdata\roaming\python\python312\site-packages (from pandas)
(2024.2)
Requirement already satisfied: tzdata>=2022.7 in
c:\users\advik\appdata\roaming\python\python312\site-packages (from pandas)
(2025.1)
Requirement already satisfied: six>=1.5 in
c:\users\advik\appdata\roaming\python\python312\site-packages (from python-
dateutil>=2.8.2->pandas) (1.16.0)
Note: you may need to restart the kernel to use updated packages.


[notice] A new release of pip is available: 25.0 -> 25.1
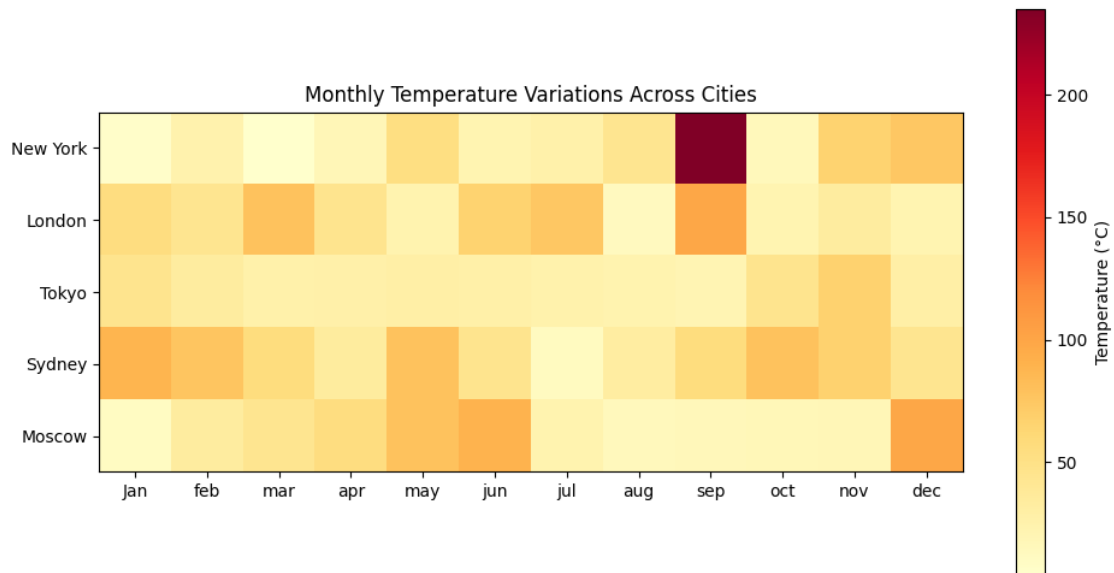[notice] To update, run: python.exe -m pip install --upgrade pip
```

[4]: ```python
import matplotlib.pyplot as plt
import numpy as np
```

[6]: ```python
cities= ['New York','London','Tokyo','Sydney','Moscow']
months=['Jan','feb', 'mar', 'apr', 'may', 'jun', 'jul', 'aug', 'sep', 'oct',
  'nov', 'dec']

temperature_data =np.array([
    [6,24,4,18,53,22,26,44,235,15,66,75], #new york
    [55,44,78,45,23,66,75,13,99,22,33,22], #london
    [45,33,26,27,29,28,25,23,21,45,67,29], #tokyo
    [88,77,56,34,78,45,12,32,56,78,67,44], #sydney
```

```
    [11,33,44,55,78,89,23,14,16,17,18,99] #moscow

])
fig, ax = plt.subplots(figsize=(10, 5))
im = ax.imshow(temperature_data, cmap='YlOrRd')
ax.set_xticks(np.arange(len(months)))
ax.set_yticks(np.arange(len(cities)))
ax.set_xticklabels(months)
ax.set_yticklabels(cities)
cbar = ax.figure.colorbar(im, ax=ax)
cbar.set_label('Temperature (°C)')
ax.set_title("Monthly Temperature Variations Across Cities")
plt.tight_layout()
plt.show()
```


INSIGHTS: This heatmap titled "Monthly Temperature Variations Across Cities" shows temperature changes throughout the year in five cities. New York and Moscow show strong seasonal variation, with noticeable summer peaks. Sydney has warmer months around the start and end of the year, reflecting its Southern Hemisphere location. Tokyo and London have relatively moderate temperature shifts. September in New York appears extremely hot, indicated by the darkest shade.